

Notice of Allowability

Application No.

10/676,240

Examiner

Dustin Nguyen

Applicant(s)

LI ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 09/13/2007.
2. ☒ The allowed claim(s) is/are 1-50.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____



EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Applicant's attorney, Mr. Gregory Hunt, on 09/27/2007.

Please amend the claims 1, 2, 4-23, 26-31, 33-42, 44, and 47-50 as follows:

1. (Currently Amended) A method for per-session network address translation (NAT) learning in a media gateway, the method comprising:

in ~~a~~ the media gateway:

(a) receiving a media session setup request for establishing a media session in which media packets are exchanged between communicating entities;

(b) in response to the media session setup request, assigning a local network and transport address combination identifying a media processing resource within the media gateway for processing the media packets associated with the media session;

(c) receiving at least one initial media packet of the media packets exchanged between the communicating entities in the media session, the at least one initial media packet being addressed to the local network and transport address combination and having a source network

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address and a source transport address, ~~at least one of~~ each of the source network address and the source transport address being a NAT-translated address assigned by ~~the~~ a network address translator;

(d) learning the NAT-translated source network address and the NAT-translated source transport address from the at least one initial media packet;

(e) processing the at least one initial media packet using the media processing resource assigned to the media session;

(f) accepting and processing subsequent media packets having the assigned local network address and local transport address in their destination address fields and the learned source network address and the learned source transport address in their source address fields; and

(g) repeating steps (a)-(f) for each new incoming session to the media gateway and thereby performing NAT learning on a per-session basis.

2. (Currently Amended) The method of claim 1 wherein receiving ~~a~~ the media session setup request includes receiving a request from a soft switch to allocate resources for a new media session.

4. (Currently Amended) The method of claim 1 wherein the media ~~stream~~ session comprises a Real-time Transmission Protocol (RTP) media stream.

5. (Currently Amended) The method of claim 1 wherein assigning ~~a~~ the local network and transport address combination includes assigning the local network and transport address

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combination to a media processing chip for processing the media ~~stream~~ session.

6. (Currently Amended) The method of claim 1 wherein learning the NAT-translated source network address includes:

- (a) receiving the at least one initial media packet at the media processing resource;
- (b) routing the at least one initial media packet from the media processing resource to a central processing unit (CPU) operatively associated with the media processing resource; and
- (c) at the CPU, extracting the NAT-translated source network address from the at least one initial media packet and thereby learning the NAT-translated source network address and broadcasting the learned source network address to a plurality of network interface cards in the media gateway.

7. (Currently Amended) The method of claim 6 comprising ~~learning the source transport address from the at least one initial media packet and~~ extracting the NAT-translated source transport address from the at least one initial media packet and thereby learning the NAT-translated source transport address and broadcasting the learned source transport address to the plurality of network interface cards in the media gateway.

8. (Currently Amended) The method of claim 7 comprising, at the plurality of network interface cards, using the learned source network address, the learned source transport address, the local network address, and the local transport address to create a per-session pin-hole for firewall filtering.

9. (Currently Amended) The method of claim 1 wherein learning the NAT-translated source network address includes dynamically assigning one of a plurality of distributed media processing elements in the media gateway to learn the NAT-translated source network address.

10. (Currently Amended) The method of claim 1 wherein learning the NAT-translated source network address includes:

- (a) receiving the at least one initial media packet at the media processing resource; and
- (b) at the media processing resource, extracting the NAT-translated source network address and thereby learning the NAT-translated source network address and broadcasting the learned source network address to a plurality of network interface cards in the media gateway.

11. (Currently Amended) The method of claim 10 comprising ~~learning the source transport address from the at least one initial media packet at the media processing resource and~~ broadcasting the learned source transport address to the plurality of network interface cards in the media gateway.

12. (Currently Amended) The method of claim 11 comprising, at the plurality of network interface cards, using the learned source network address, the learned source transport address, the local network address, and the local transport address to create a per-session pin-hole for firewall filtering.

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13. (Currently Amended) The method of claim 10 wherein the media ~~stream~~ session comprises a voice-over-IP-to-voice-over-IP media stream and wherein accepting and processing subsequent media packets associated for the media session includes receiving subsequent media packet associated with the media session at a first network interface card, determining a destination network interface card based on ~~the~~ a destination address, and forwarding all the subsequent media packets to the selected destination network interface card.

14. (Currently Amended) The method of claim 1 comprising, after step (d), performing firewall filtering for the subsequent media packets using the local network address, the local transport address, the NAT-translated source network address, and the NAT-translated source transport address.

15. (Currently Amended) The method of claim 14 wherein performing firewall filtering includes rejecting media packets that have the local network address and the local transport address in their destination address fields but do not have the NAT-translated source network address and the NAT-translated source transport address in their source address fields.

16. (Currently Amended) The method of claim 1 wherein the media session comprises a voice call and wherein the method further comprises seamlessly inserting an internal media processor into the voice call without changing topology of the voice call during any time of the voice call, including call initialization time, call active state, and call release time.

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17. (Currently Amended) The method of claim 16 wherein inserting ~~an~~ the internal media processor into the voice call includes inserting at least one of: an announcement server, a conference bridge, a DTMF generator, a DTMF collector, a voice mail server, and a law enforcement circuit into the voice call.

18. (Currently Amended) The method of claim 1 wherein the media session comprises a voice call and wherein the method further comprises comprising seamlessly inserting an ~~internal~~ external media processor into the voice call without changing topology of the voice call for the duration of the voice call, including call initialization time, call active state, and call release time.

19. (Currently Amended) The method of claim 18 wherein inserting ~~an internal~~ the external media processor into the voice call includes inserting at least one of: an announcement server, a conference bridge, a DTMF generator, a DTMF collector, a voice mail server, and a law enforcement circuit into the voice call.

20. (Currently Amended) A media gateway with internal network address translation (NAT) learning capabilities, the media gateway comprising:

(a) a plurality of network interface cards for receiving media packets exchanged between communicating entities in media sessions, for determining whether the media packets have been assigned to a session, and for forwarding the media packets that have been assigned to ~~a~~ the session to a media processing resource;

(b) a plurality of media processing resources for processing the media packets that have been assigned to a the session, the plurality of media processing resources being assigned to the media sessions based on media session setup requests, wherein, when a media session setup request is received, a local network and transport address combination identifying the media processing resource in the media gateway for processing media packets associated with the session is assigned to the session; and

(c) a NAT learning function located within the media gateway and operatively associated with the media processing resources and the plurality of network interface cards for learning, from at least one initial media packet of the media packets exchanged between communicating entities in each session, ~~dynamically~~ NAT-translated source network addresses and NAT-translated source transport addresses assigned by ~~the a network address translators~~ translator to the media packets and for communicating the learned source network and transport addresses to the network interface cards.

21. (Currently Amended) The media gateway of claim 20 wherein the plurality of network interface cards comprise packet network interface cards.

22. (Currently Amended) The media gateway of claim 20 wherein the plurality of network interface cards comprise ATM network interface cards.

23. (Currently Amended) The media gateway of claim 20 wherein the plurality of media processing resources include voice-over-IP SAR chips for processing voice-over-IP calls.

26. (Currently Amended) The media gateway of claim 20 wherein the plurality of media processing resources include a first codec and a second codec and wherein the first codec and the second codec are used to perform transcoding for at least one of voice-over-IP to voice-over-IP calls, voice-over-IP to voice-over-AAL1 calls and voice-over-IP to voice-over-AAL2 calls.

27. (Currently Amended) The media gateway of claim 20 wherein the NAT learning function is adapted to ~~learn the source network address and the source transport address and to~~ distribute the learned source network addresses and the learned source transport addresses to at least one of the plurality of network interface cards and wherein the plurality of network interface cards are adapted to accept media packets addressed to ~~a~~ the local network address and the local transport address, the learned source network address, and the learned source transport address assigned to the session ~~and from the learned source network address and the learned source transport address.~~

28. (Currently Amended) The media gateway of claim 27 wherein the plurality of network interface cards ~~area~~ are adapted to reject media packets addressed to the local source network address and local source transport address assigned to the session but that do not have the ~~dynamically~~ learned source network address and ~~dynamically~~ learned source transport address assigned to the session.

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29. (Currently Amended) The media gateway of claim 20 wherein the NAT learning function is adapted to selectively filter media packets for each session based on ~~a~~the local network address, ~~a~~the local transport address, ~~a dynamically~~ the learned source address, and ~~a dynamically~~ the learned transport address assigned to each session, thereby performing firewall filtering on a per-session basis.

30. (Currently Amended) A computer program product for per-session network address translation (NAT) learning in a media gateway, the computer program product comprising computer executable instructions embodied in a computer readable medium for performing steps comprising:

in ~~a~~the media gateway:

(a) receiving a media session setup request for establishing a media session in which media packets are exchanged between communicating entities;

(b) in response to the media session setup request, assigning a local network and transport address combination identifying a media processing resource within the media gateway for processing the media packets associated with the media session;

(c) receiving at least one initial media packet of the media packets exchanged between the communicating entities in the media session, the at least one initial media packet being addressed to the local network and transport address combination, the at least one initial media packet having a source network address and a source transport address, ~~at least one of~~ each of the source network address and the source transport address being a NAT-translated address assigned by ~~the~~ a network address translator;

(d) learning the NAT-translated source network address and the NAT-translated source transport address from the at least one initial media packet;

(e) processing the at least one initial media packet using the media processing resource assigned to the media session;

(f) accepting and processing subsequent media packets having the local network address and local transport address in their destination address fields and the learned source network address and the learned source transport address in their source address fields; and

(g) repeating steps (a)-(f) for each new session to the media gateway and thereby performing NAT learning on a per-session basis.

31. (Currently Amended) The computer program product of claim 30 wherein receiving ~~a~~the media session setup request includes receiving a request for allocating resources for a new media session from a soft switch.

33. (Currently Amended) The computer program product of claim 30 wherein the media ~~stream~~ session comprises a Real-time Transmission Protocol (RTP) media stream.

34. (Currently Amended) The computer program product of claim 30 wherein the media ~~stream~~ session comprises a Real-time Transmission Control Protocol (RTCP) media stream.

35. (Currently Amended) The computer program product of claim 30 wherein assigning ~~a~~the local network and transport address combination includes assigning the local network and

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transport address combination to a media processing chip for processing the media ~~stream~~
session.

36. (Currently Amended) The computer program product of claim 30 wherein learning the
NAT-translated source network address includes:

- (a) receiving the at least one initial media packet at the media processing resource;
- (b) routing the at least one initial media packet from the media processing resource to a central processing unit (CPU) operatively associated with the media processing resource; and
- (c) at the CPU, extracting the NAT-translated source network address from the at least one initial media packet and thereby learning the NAT-translated source network address and broadcasting the learned source network address to a plurality of network interface cards in the media gateway.

37. (Currently Amended) The computer program product of claim 36 comprising ~~learning the source transport address by~~ extracting the NAT-translated source transport address from the at least one initial media packet and thereby learning the NAT-translated source transport address and broadcasting the learned source transport address to the plurality of network interface cards in the media gateway.

38. (Currently Amended) The computer program product of claim 37 comprising, at the plurality of network interface cards, using the learned source network address, the learned

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source transport address, the local network address, and the local transport address to create a per-session pin-hole for firewall filtering.

39. (Currently Amended) The computer program product of claim 30 wherein learning the NAT-translated source network address includes:

(a) receiving the at least one initial media packet at the media processing resource; and
(b) at the media processing resource, extracting the NAT-translated source network address from the at least one initial media packet and thereby learning the NAT-translated source network address and broadcasting the learned source network address to a plurality of network interface cards in the media gateway.

40. (Currently Amended) The computer program product of claim 39 comprising ~~learning the source transport address by extracting the source transport address from the media packet and~~ broadcasting the learned source transport address to the plurality of network interface cards in the media gateway.

41. (Currently Amended) The computer program product of claim 40 comprising, at the plurality of network interface cards, using the learned source network address, the learned source transport address, the local network address, and the local transport address to create a per-session pin-hole for firewall filtering.

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42. (Currently Amended) The computer program product of claim 39 wherein the media stream session comprises a voice-over-IP-to-voice-over-IP media stream and wherein accepting and processing subsequent media packets includes receiving subsequent media packets associated with the media session at ~~the~~ a first network interface card, determining a destination network interface card based on a destination address in the subsequent media packets, and forwarding the subsequent media packets to the selected destination network interface card.

44. (Currently Amended) The computer program product of claim 42 wherein accepting and processing subsequent media packets includes forwarding the subsequent media packets to the selected destination interface card without performing transcoding.

47. (Currently Amended) The computer program product of claim 30 wherein the media session comprises a voice call and wherein the computer program product further performs the step of seamlessly inserting an internal media ~~server~~ processor into the voice call without changing topology of the voice call during any time of the voice call, including call initialization time, active state, and call release time.

48. (Currently Amended) The system of claim 47 wherein seamlessly inserting ~~an~~ the internal media processor into the voice call includes seamlessly inserting at least one of: an announcement player, a conference bridge, a DTMF generator, a DTMF collector, a voice mail server, and a law enforcement circuit into the voice call.

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49. (Currently Amended) The computer program product of claim 30 wherein the media session comprises a voice call and wherein the computer program product further performs the step of seamlessly inserting an external media processor into the voice call without changing topology of the voice call during any time of the voice call, including call initialization time, active state, and call release time.

50. (Currently Amended) The system of claim 49 wherein seamlessly inserting ~~an~~ the external media processor into the voice call includes seamlessly at least one of: an announcement player, a conference bridge, a DTMF generator, a DTMF collector, a voice mail server, and a law enforcement circuit into the voice call.

REASONS FOR ALLOWANCE

2. The following is an examiner's statement of reasons for allowance:

With respect to claims 1-50, the prior art of record, individually or in combination, fails to teach, suggest or render obvious the claimed invention in combination with the specific amended limitations as recited in claims 1, 20 and 30. Specifically, inter alia, the prior art of record fails to teach or suggest in the media gateway: (a) receiving a media session setup request for establishing a media session in which media packets are exchanged between communicating entities; (b) in response to the media session setup request, assigning a local network and transport address combination identifying a media processing resource within the media gateway for processing the media packets associated with the media session; (c) receiving at least one

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initial media packet of the media packets exchanged between the communicating entities in the media session, the at least one initial media packet being addressed to the local network and transport address combination and having a source network address and a source transport address, each of the source network address and the source transport address being a NAT-translated address assigned by a network address translator; (d) learning the NAT-translated source network address and the NAT-translated source transport address from the at least one initial media packet; (e) processing the at least one initial media packet using the media processing resource assigned to the media session; (f) accepting and processing subsequent media packets having the assigned local network address and local transport address in their destination address fields and the learned source network address and the learned source transport address in their source address fields; and (g) repeating steps (a)-(f) for each new incoming session to the media gateway and thereby performing NAT learning on a per-session basis (as disclosed in specification, pages 10-15, and Figures 4 and 5).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dustin Nguyen whose telephone number is (571) 272-3971. The examiner can normally be reached on flex schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Flynn Nathan can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dustin Nguyen
Examiner
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